

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
21 May 2004 (21.05.2004)

PCT

(10) International Publication Number  
**WO 2004/041406 A1**

(51) International Patent Classification<sup>7</sup>: **B01D 29/01**,  
33/00, B07B 1/46, 1/48

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(21) International Application Number:  
PCT/GB2003/004531

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG,  
SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN,  
YU, ZA, ZM, ZW.

(22) International Filing Date: 20 October 2003 (20.10.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0225619.6 2 November 2002 (02.11.2002) GB

(84) Designated States (*regional*): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO,  
SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM,  
GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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Published:

— with international search report

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*For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.*

(54) Title: **WOVEN WIRE CLOTH SCREEN**

(57) Abstract: A woven wire cloth screen is described in which at least one fine mesh cloth overlies a coarser mesh backing cloth and an additional coarser mesh cloth is secured over the fine mesh cloth, whose mesh and wire size at least are selected so as in general to prevent relatively large abrasive particles from making contact with the fine mesh cloth. Two fine mesh cloths may be sandwiched between the coarser cloths. In one screen the backing cloth is 30# x 0.1280mm diameter S/S wire, the upper fine mesh is 180# x 0.030mm diameter S/S wire, the lower fine mesh is 160# x 0.036mm diameter S/S wire, and the additional top cloth is 30# x 60# x 0.160mm diameter S/S wire. A method of making such a screen is described in which the cloths are in turn laid over a rigid frame to which they are to be bonded and the tension in the wire mesh cloths is achieved using pneumatically powered rams acting on clamps which grip the edges of the cloths. All the rams are of the same size and different tensions are imparted to the cloths by supplying air at differing pressures to the rams acting on the different cloths. In particular a method is described for making a woven wire cloth screen which will withstand highly abrasive large particles such as obtained when drilling through Utsira sand, in which a support frame is located in a jig, a coarse backing cloth is stretched over the frame -and secured between clamping jaws along all four edges and then tensioned by moving all the clamps relatively outwardly by pneumatic rams. A fine mesh wirecloth is then stretched over the first cloth and similarly tensioned by means of a second set of clamps and rams. An additional coarse mesh cloth is then similarly stretched over the fine mesh cloth and tensioned by means of a third set of clamps and rams. Thereafter the cloths are secured to the support frame under pressure. After releasing the pressure, opening the clamping jaws, and trimming surplus wirecloth back to the frame, the finished screen can be removed from the jig. A second fine mesh cloth can be laid over the first fine mesh cloth before the top coarse cloth is applied, and the two fine mesh cloths can be clamped using the same set of jaws and rams.

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PCT/GB 04531

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 B01D29/01 B01D33/00 B07B1/46 B07B1/48		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 B01D B07B		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 958 236 A (BAKULA JOHN J) 28 September 1999 (1999-09-28)	1,4,7, 11,12
Y	column 9, lines 44-62; figures 1,6,22	2,3,17
X	US 6 454 099 B1 (GRICHAR CHARLES N ET AL) 24 September 2002 (2002-09-24)	1,4,7, 11,12
Y	column 11, line 67 - column 12, line 5; figures 1A,13C	2,3,17
X	US 5 221 008 A (DERRICK JR H WILLIAM ET AL) 22 June 1993 (1993-06-22)	1,4,7, 11,12
Y	column 5, lines 3-29; figures 1,3	2,3,17
Y	GB 2 322 590 A (UNITED WIRE LTD) 2 September 1998 (1998-09-02) abstract page 6, line 16 - page 7, line 20; claims 28-30	2,3,17
-/-		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
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Date of the actual completion of the international search  11 February 2004		Date of mailing of the international search report  17/02/2004
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  Hoffmann, A

# INTERNATIONAL SEARCH REPORT

International Publication No  
PCT/GB 04531

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 169 698 A (THULE UNITED LTD) 29 January 1986 (1986-01-29) page 9, line 20 - page 12, line 6 -----	2,3
Y	GB 2 308 315 A (UNITED WIRE LTD) 25 June 1997 (1997-06-25) page 2, column 26 - page 3, column 7 -----	2,3
A	WO 99/24144 A (ITS DRILLING SERVICES LTD ; MORRIS RONALD G (GB); RENNIE LYALL (GB)) 20 May 1999 (1999-05-20) page 3, lines 11-32 -----	2,3
A	US 5 927 511 A (BALTZER TERRY L ET AL) 27 July 1999 (1999-07-27) column 5, lines 57-67; figures 10,11 -----	17
A	US 4 696 751 A (EIFLING DENNIS R) 29 September 1987 (1987-09-29) column 2, line 60 - column 3, line 27; figures 1,2 -----	8,9

# INTERNATIONAL SEARCH REPORT

International patent family members

International Application No  
PCT/GB 04531

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5958236	A	28-09-1999	US 5783077 A	21-07-1998
			US 5417859 A	23-05-1995
			US 5417858 A	23-05-1995
			US 6053332 A	25-04-2000
			US 6340089 B1	22-01-2002
			US 2002033358 A1	21-03-2002
			US 6000556 A	14-12-1999
			US 5876552 A	02-03-1999
			AU 690096 B2	23-04-1998
			AU 6084494 A	15-08-1994
			CA 2152602 A1	21-07-1994
			DE 69420701 D1	21-10-1999
			DE 69420701 T2	02-03-2000
			DK 680385 T3	31-01-2000
			EP 0680385 A1	08-11-1995
			ES 2135563 T3	01-11-1999
			WO 9415723 A1	21-07-1994
			US 5417793 A	23-05-1995
			AU 693086 B2	25-06-1998
			AU 6023194 A	15-08-1994
			AU 714591 B2	06-01-2000
			AU 6593998 A	09-07-1998
			CA 2152610 A1	21-07-1994
			DE 69421381 D1	02-12-1999
			DE 69421381 T2	06-04-2000
			DK 680386 T3	24-01-2000
			EP 0680386 A1	08-11-1995
			ES 2137356 T3	16-12-1999
			WO 9415724 A1	21-07-1994
			US 5720881 A	24-02-1998
			US 5868929 A	09-02-1999
			US 5944993 A	31-08-1999
US 6454099	B1	24-09-2002	US 6152307 A	28-11-2000
			US 6267247 B1	31-07-2001
			US 5988397 A	23-11-1999
			US 5971159 A	26-10-1999
			US 5385669 A	31-01-1995
			US 5392925 A	28-02-1995
			US 5598930 A	04-02-1997
			US 5490598 A	13-02-1996
			US 6565698 B1	20-05-2003
			US 6283302 B1	04-09-2001
			US 6401934 B1	11-06-2002
			AU 7433600 A	17-04-2001
			CA 2381726 A1	22-03-2001
			EP 1212130 A1	12-06-2002
			EP 1270058 A2	02-01-2003
			WO 0119492 A1	22-03-2001
			NO 20020854 A	08-05-2002
			US 6629610 B1	07-10-2003
			US 6581781 B1	24-06-2003
			US 2002000399 A1	03-01-2002
			US 2002079251 A1	27-06-2002
			AU 2303100 A	01-08-2000
			CA 2359346 A1	20-07-2000
			EP 1140379 A1	10-10-2001
			WO 0041822 A1	20-07-2000

# INTERNATIONAL SEARCH REPORT

Form 1 patent family members

International Application No

PCT/GB 4531

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6454099	B1	NO 20012900 A	31-08-2001
		US 2003038061 A1	27-02-2003
		US 6290068 B1	18-09-2001
		US 6325216 B1	04-12-2001
		US 6269953 B1	07-08-2001
		US 6443310 B1	03-09-2002
		US 6450345 B1	17-09-2002
		US 2002043485 A1	18-04-2002
		AU 1159600 A	22-05-2000
		CA 2349538 A1	11-05-2000
		WO 0025943 A2	11-05-2000
		EP 1128914 A2	05-09-2001
		NO 20010776 A	05-04-2001
		US 6371302 B1	16-04-2002
		AU 8447898 A	10-02-1999
		WO 9903601 A1	28-01-1999
		GB 2341567 A ,B	22-03-2000
		NO 995669 A	15-03-2000
		US 6302276 B1	16-10-2001
		AT 257044 T	15-01-2004
		AT 198168 T	15-01-2001
		AU 1799397 A	28-08-1997
		CA 2240693 A1	14-08-1997
		DE 69703730 D1	25-01-2001
		EP 1002588 A1	24-05-2000
US 5221008	A	22-06-1993	NONE
GB 2322590	A	02-09-1998	GB 2337019 A ,B
		AT 256509 T	10-11-1999
		AT 252949 T	15-01-2004
		AT 237409 T	15-11-2003
		AU 724886 B2	15-05-2003
		AU 6304498 A	05-10-2000
		BR 9807644 A	18-09-1998
		DE 69813521 D1	22-02-2000
		DE 69813521 T2	22-05-2003
		DE 69819371 D1	24-12-2003
		DE 69820683 D1	04-12-2003
		DK 1205263 T3	29-01-2004
		DK 963261 T3	05-01-2004
		EP 1205261 A2	02-06-2003
		EP 1205262 A2	15-05-2002
		EP 1205263 A2	15-05-2002
		EP 1205264 A2	15-05-2002
		EP 1205265 A2	15-05-2002
		EP 0963261 A1	15-12-1999
		ES 2197462 T3	01-01-2004
		WO 9837988 A1	03-09-1998
		HK 1024200 A1	08-08-2003
		JP 2001513020 T	28-08-2001
		NO 994245 A	01-09-1999
		US 2002088531 A1	11-07-2002
		US 2002088532 A1	11-07-2002
		US 2002088747 A1	11-07-2002
		US 2002096470 A1	25-07-2002
		US 2002113043 A1	22-08-2002
		US 6675975 B1	13-01-2004

# INTERNATIONAL SEARCH REPORT

Form 1 patent family members

International Application No  
PCT/GB 4531

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2322590	A		ZA 9801678 A ZA 9902852 A	27-08-1999 27-08-1999
EP 0169698	A	29-01-1986	AU 573868 B2 AU 4520185 A CA 1274189 A1 EP 0169698 A2 ES 296761 U GB 2161715 A ,B GB 2162091 A ,B GB 2175222 A ,B JP 2556678 B2 JP 61038607 A NO 852856 A ,B, US 4728422 A ZA 8505410 A ES 8706467 A1	23-06-1988 23-01-1986 18-09-1990 29-01-1986 16-01-1988 22-01-1986 29-01-1986 26-11-1986 20-11-1996 24-02-1986 22-01-1986 01-03-1988 26-03-1986 16-09-1987
GB 2308315	A	25-06-1997	NONE	
WO 9924144	A	20-05-1999	GB 2346817 A ,B WO 9924144 A1 NO 20002402 A	23-08-2000 20-05-1999 07-07-2000
US 5927511	A	27-07-1999	AU 4000499 A CA 2332539 A1 EP 1098688 A1 WO 0000264 A1	17-01-2000 06-01-2000 16-05-2001 06-01-2000
US 4696751	A	29-09-1987	GB 2194167 A ,B	02-03-1988